

Digital Twins in a Federated Architecture

UNCEFACT 11 November 2020

Technology Developments : Potential for impacting Cross-Border Trade

rHEMELEERS@51biz.lu



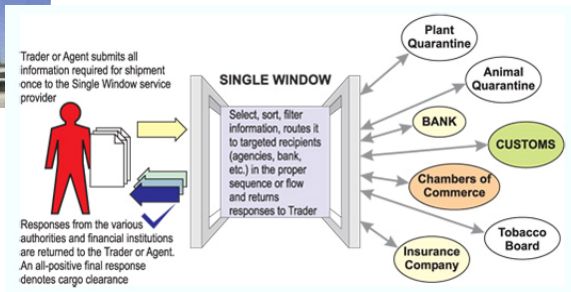
Co-financed by the Connecting Europe Facility of the European Union

VISIT...

LANZAROTE
Caliente.COM

Focus on multi-modal supply chain integration

UN/CEFACT, WCO, DG Move DTLF



Fine Art and Luxembourg Freeport



e-CMR BeNeLux, eFTI Luxembourg



Belarus, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Iran, Latvia, Lithuania, Luxembourg, Moldavia, Poland, Portugal, Romania, Slovakia, Slovenia, Netherlands, Norway, Oman, Russia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Ukraine, UK and Uzbekistan

Digital Europe for Transport and Logistics



rhemeleers@51biz.lu

Objectives of this presentation



1. Digital twins: create a common understanding
2. The emerging role of digital twins in cross-border trade and supply chains
3. Digital twins in a federated architecture
4. EU-Gate living lab



[illegible]

Digital twins defined



A digital twin is a digital mirror of a physical entity.

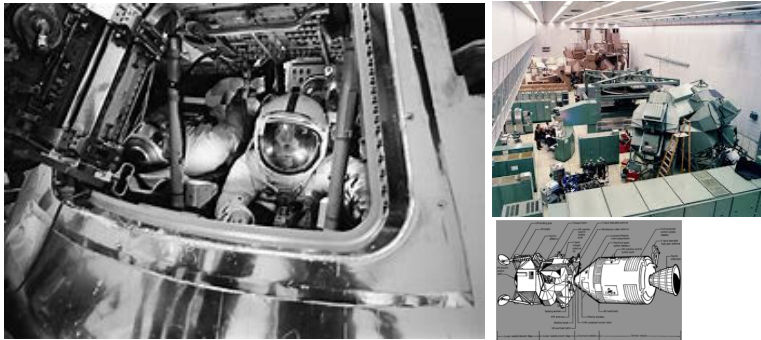
By combining the physical and the virtual world, data is provided enabling the virtual entity to exist at the same time with the physical entity.

- *Share data with multiple eco systems*
- *Real-time analysis, prediction and exception management*
- *IoT, big data and cloud computing, AI, augmented reality provide intelligence to simulate and steer the behavior physical objects*



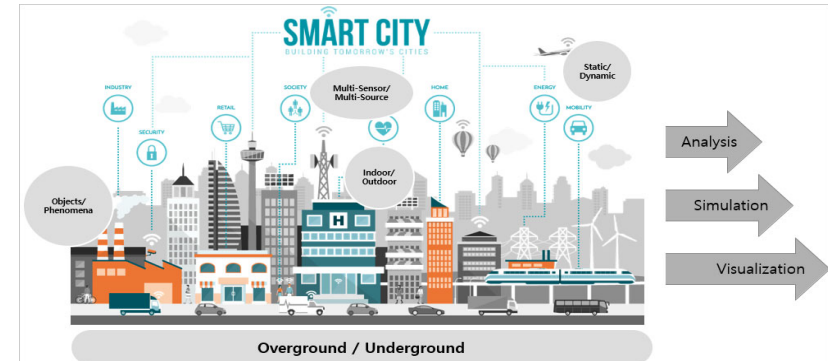
digital twins are evolving over time

Apollo 13 : the first digital twin



<https://blogs.sw.siemens.com/simcenter/apollo-13-the-first-digital-twin/>

Smart City as a Digital Twin



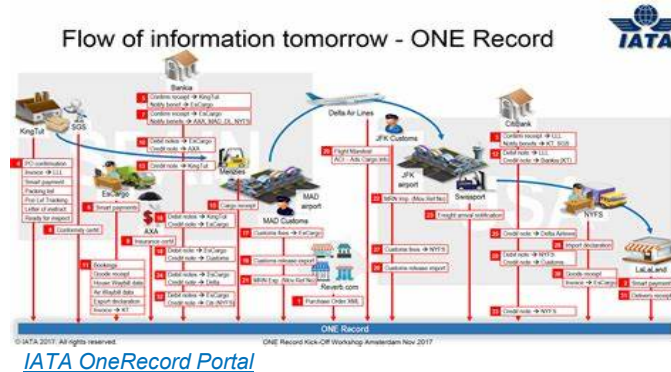
<Source: <https://www.arcweb.com/ja/node/149>>

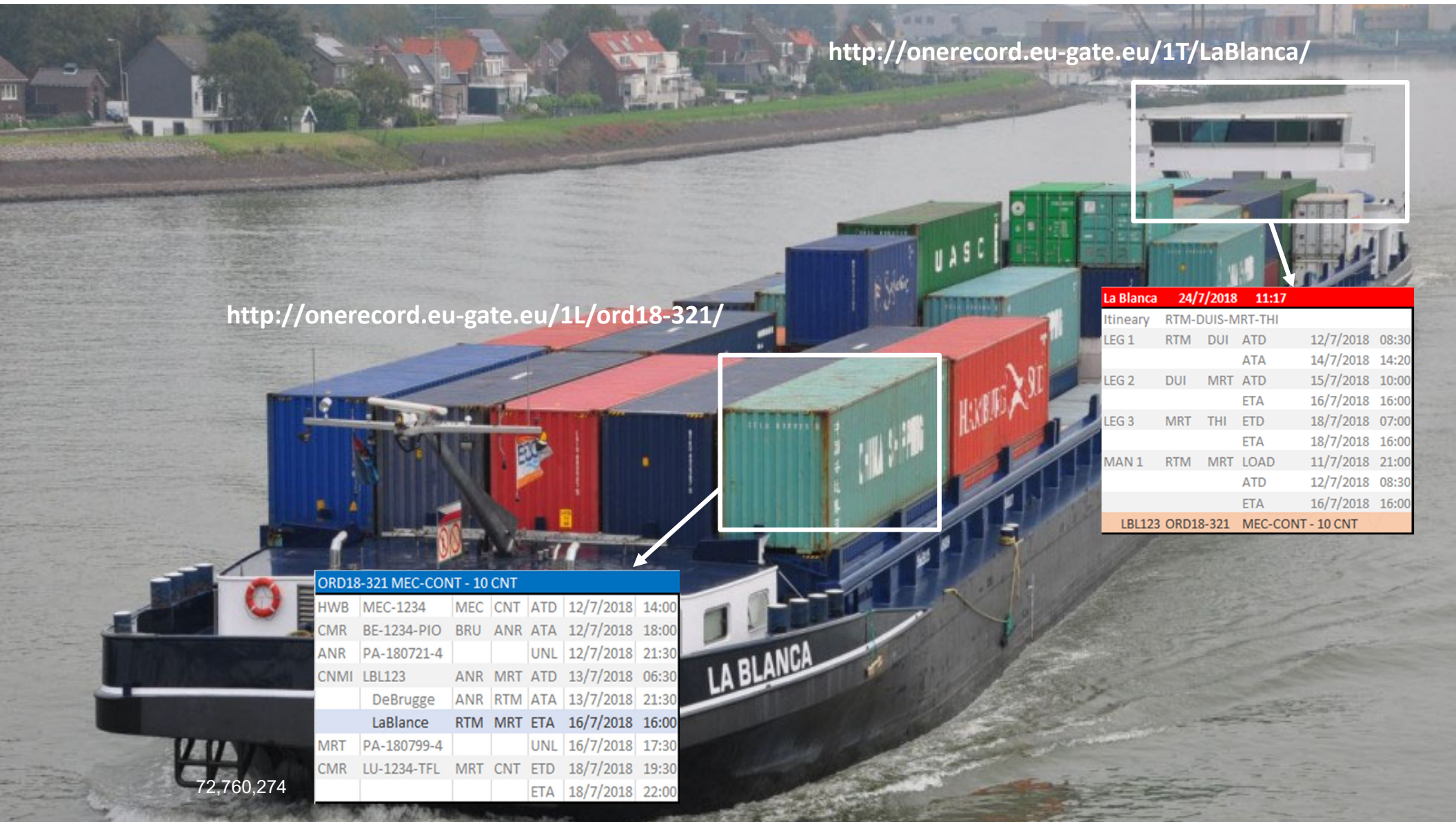
Digital Twins for the Maritime Sector



<https://maritime-executive.com/editorials/digital-twins-for-the-maritime-sector>

IATA OneRecord Virtual Shipment Record





<http://onerecord.eu-gate.eu/1T/LaBlanca/>

<http://onerecord.eu-gate.eu/1L/ord18-321/>

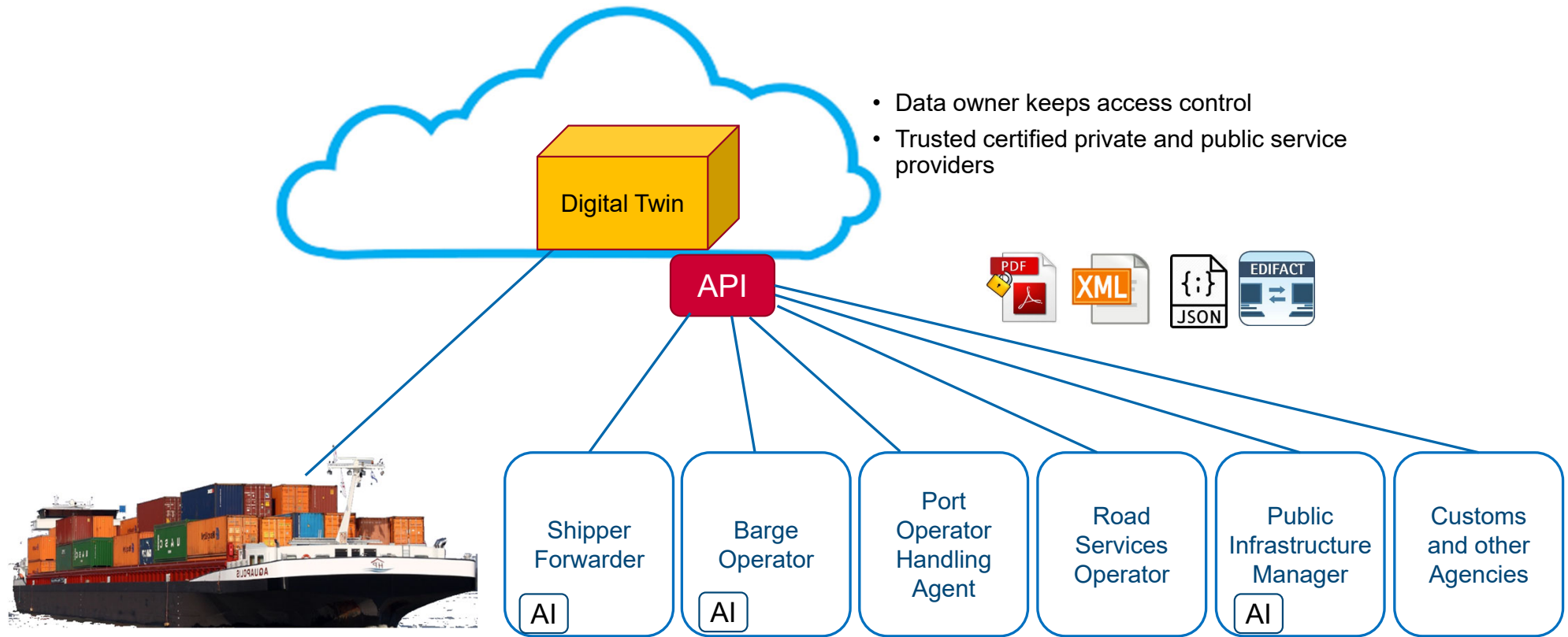
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Itineary	RTM-DUIS-MRT-THI				
LEG 1	RTM	DUI	ATD	12/7/2018	08:30
			ATA	14/7/2018	14:20
LEG 2	DUI	MRT	ATD	15/7/2018	10:00
			ETA	16/7/2018	16:00
LEG 3	MRT	THI	ETD	18/7/2018	07:00
			ETA	18/7/2018	16:00
MAN 1	RTM	MRT	LOAD	11/7/2018	21:00
			ATD	12/7/2018	08:30
			ETA	16/7/2018	16:00
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ORD18-321 MEC-CONT - 10 CNT						
HWB	MEC-1234	MEC	CNT	ATD	12/7/2018	14:00
CMR	BE-1234-PIO	BRU	ANR	ATA	12/7/2018	18:00
ANR	PA-180721-4			UNL	12/7/2018	21:30
CNMI	LBL123	ANR	MRT	ATD	13/7/2018	06:30
	DeBrugge	ANR	RTM	ATA	13/7/2018	21:30
	LaBlance	RTM	MRT	ETA	16/7/2018	16:00
MRT	PA-180799-4			UNL	16/7/2018	17:30
CMR	LU-1234-TFL	MRT	CNT	ETD	18/7/2018	19:30
				ETA	18/7/2018	22:00

72,760,274

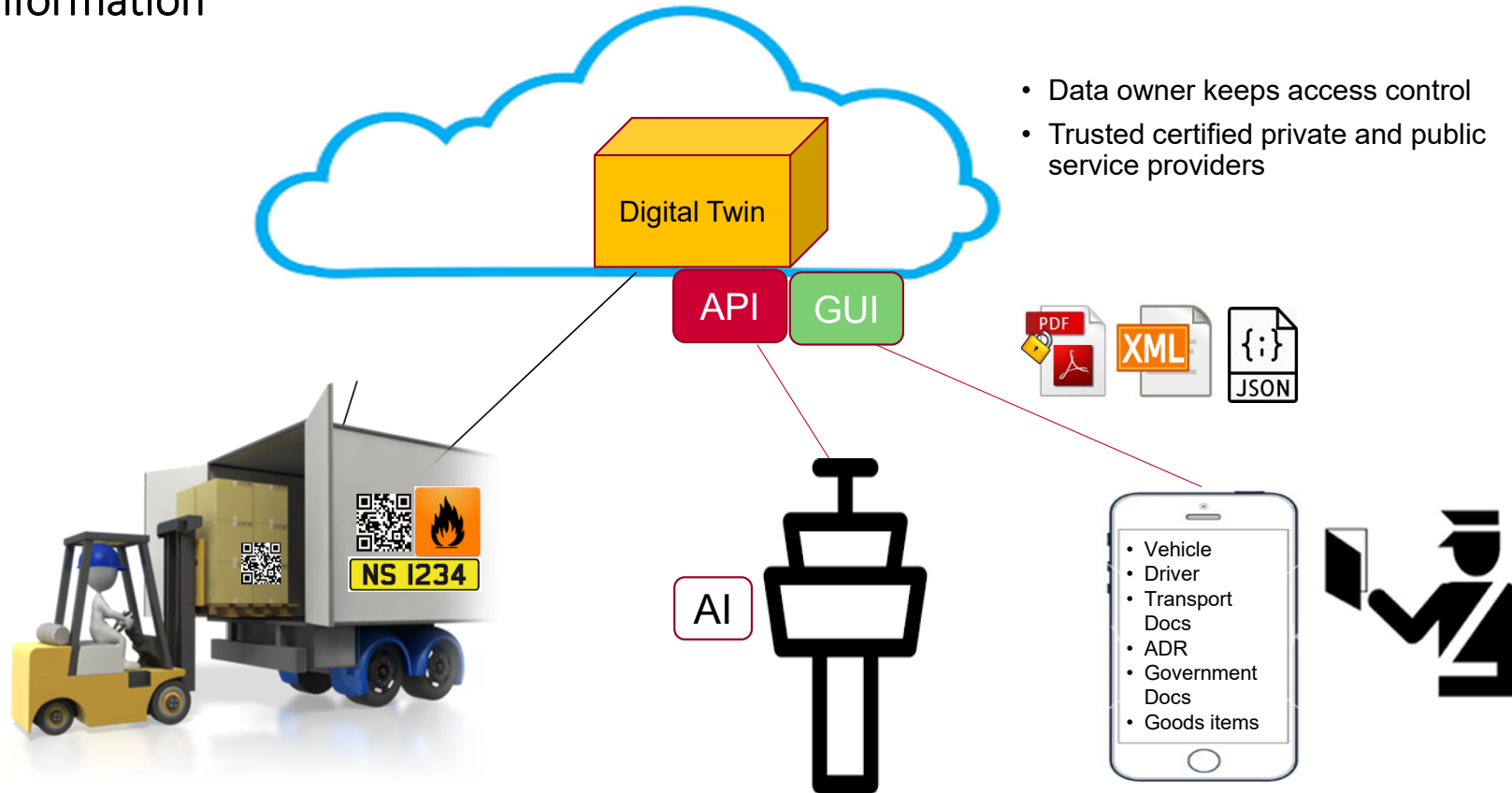
A digital twin for inland navigation

A digital twin dataset to capture all data that will be shared between the barge operator, trusted supply chain partners and government authorities



A digital twin for road transport

e-CMR service providers offer their customers with a direct online access to latest updated information



Business Opportunity

Belgian e-CMR
Survey (2019)

[link to analysis of survey](#)



€ 13,11



Paper CMR

€ 22,83



€ 8,95



€ 11,56



€ 2,32



e-CMR

€ 9,72



€ 2,51



€ 6,04



€ 1,16



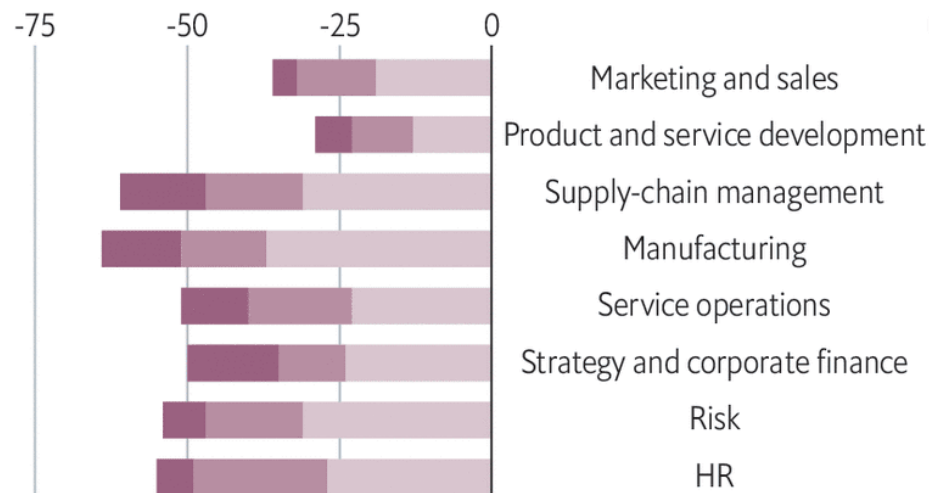
The impact from AI adoption

The bottom line

Average cost decrease and revenue increase from AI adoption, % of respondents* reporting

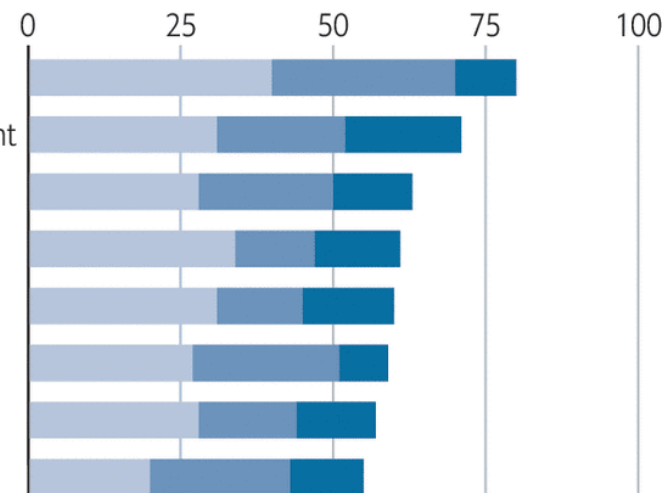
Costs decreasing

■ More than 20% ■ 10-19% ■ Less than 10%



Revenues increasing

■ Less than 5% ■ 6-10% ■ More than 10%



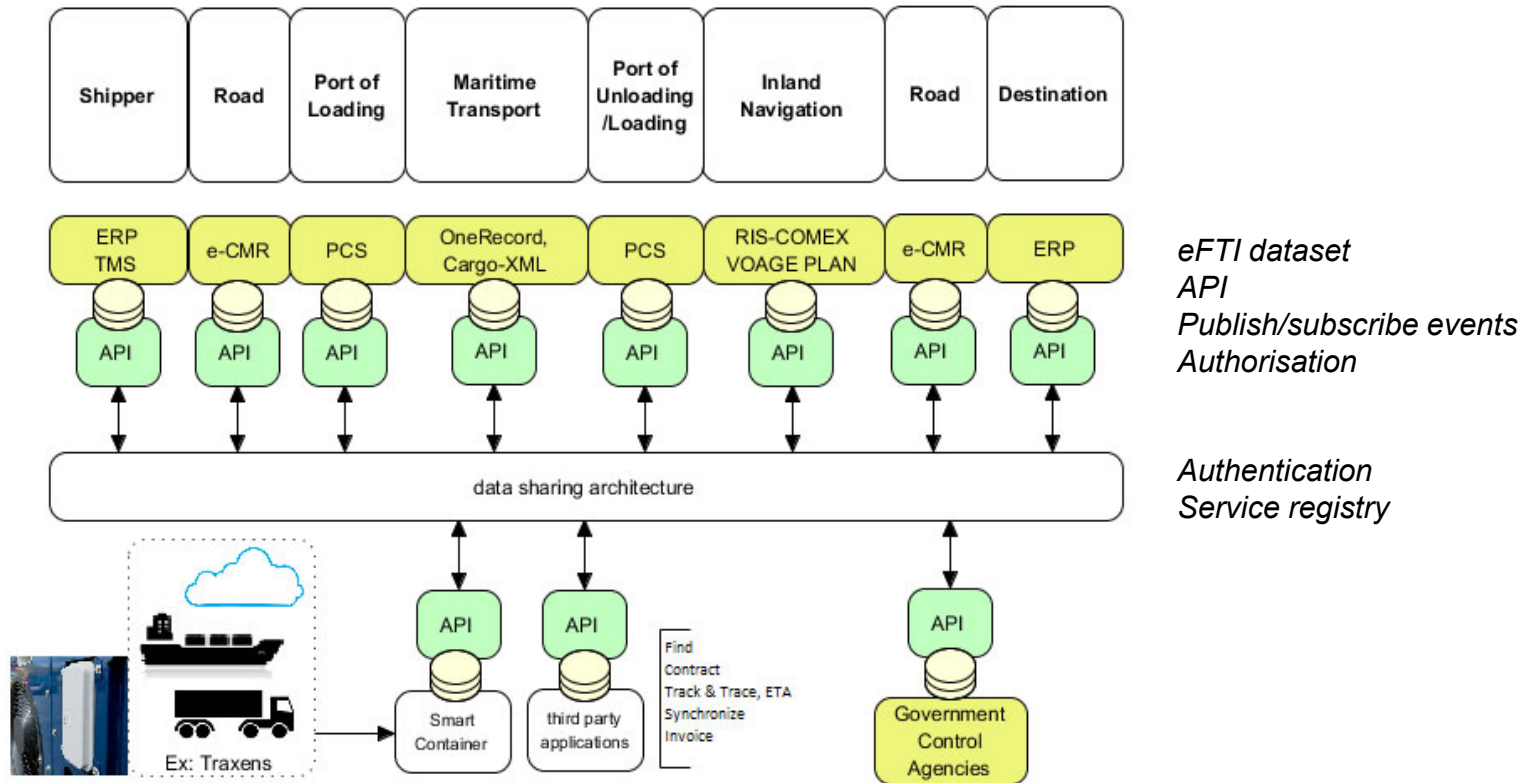
Source: McKinsey & Company
The Economist

*Surveyed November 2019



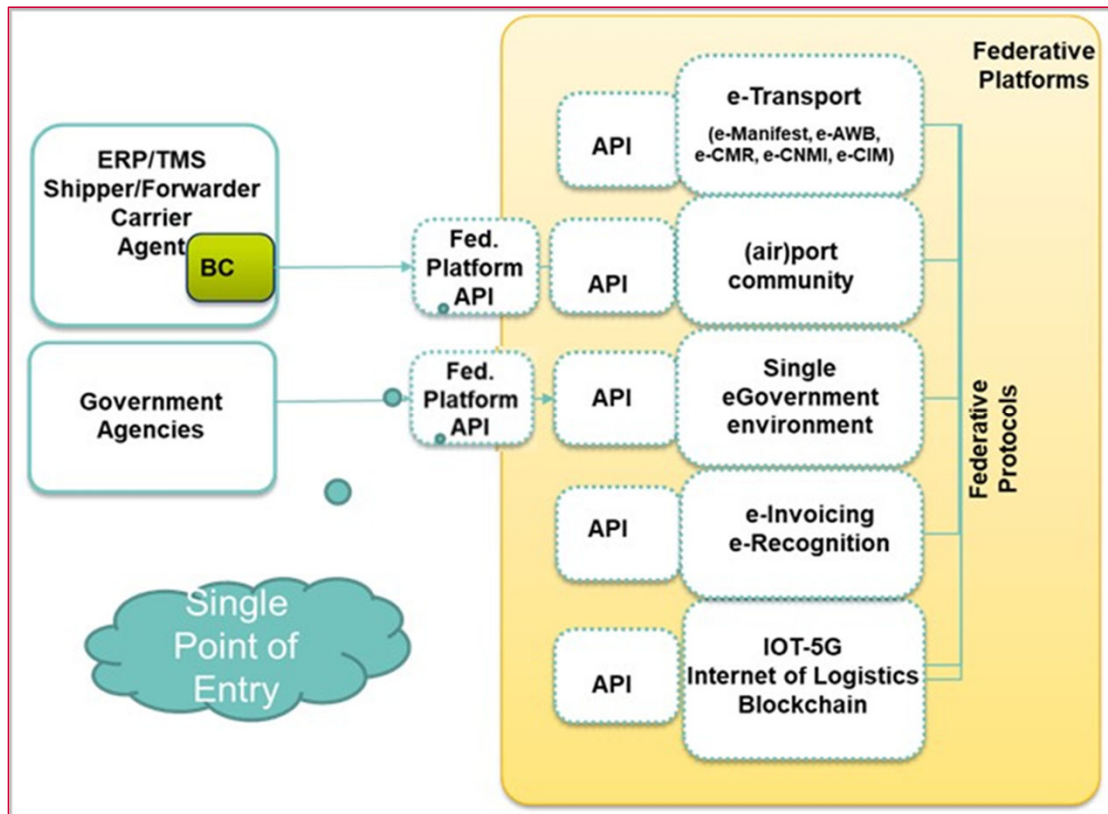
The role of a data sharing infrastructure

Sharing data between the logistics chain, barge operator and IWT infrastructure managers.
We need standards that are global, open, neutral and multimodal



FEDeRATED

EU-CEF Funded Consortium (2019-2023)



Project partners

Netherlands
Finland
Sweden
Spain
Italy

IATA
OneRecord

51Biz-PPMB
Luxembourg

Active observers

Germany
Estonia
Latvia
Portugal
Benelux

Non-EU pilots

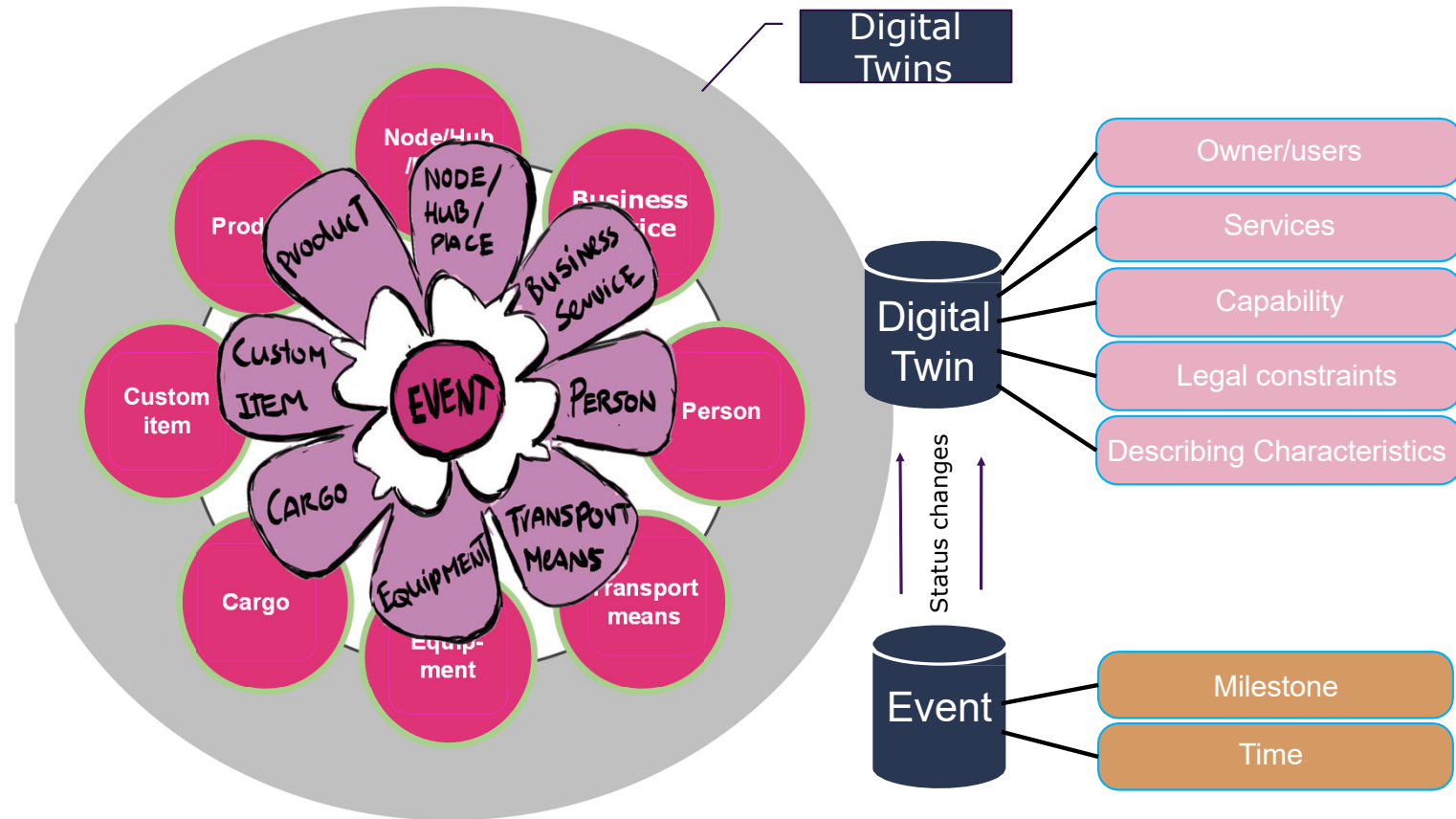
Norway
Singapore
India
China



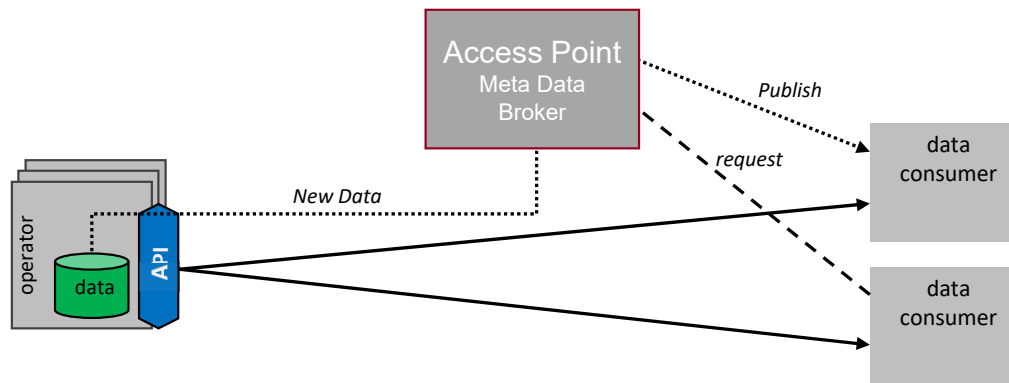
Co-financed by the Connecting Europe
Facility of the European Union



FEDeRATED reference architecture



Towards an Internet of Logistics



GET https://api01.eu-gate.eu/companies/LU51000025/los/cmr_LU123456TFY

↑
access point storing meta data required to find source of data

↑
Unique ID of the issuer/owner of a document/dataset

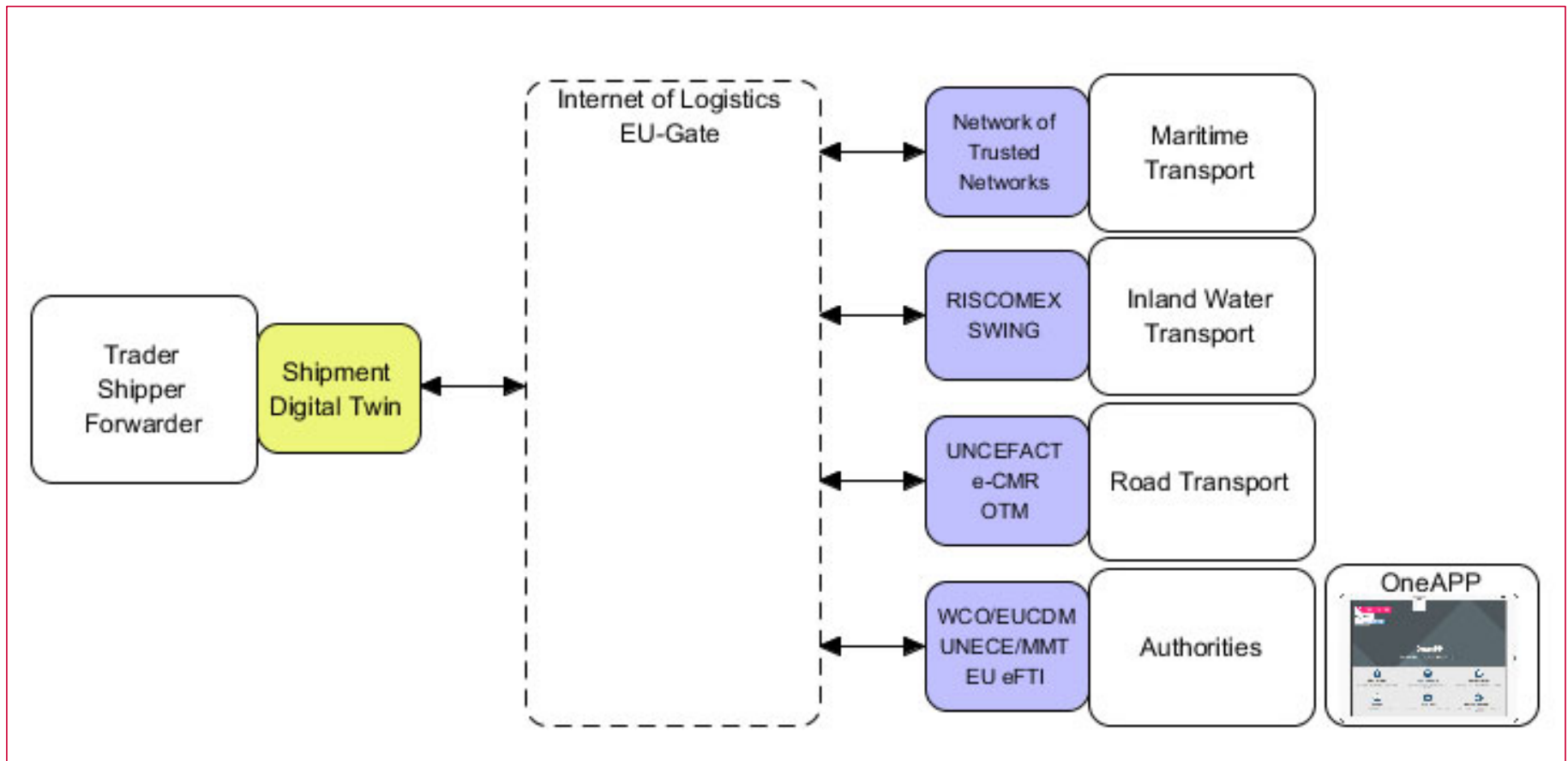
↑
Search “logistics objects”

↑
ID of document, dataset

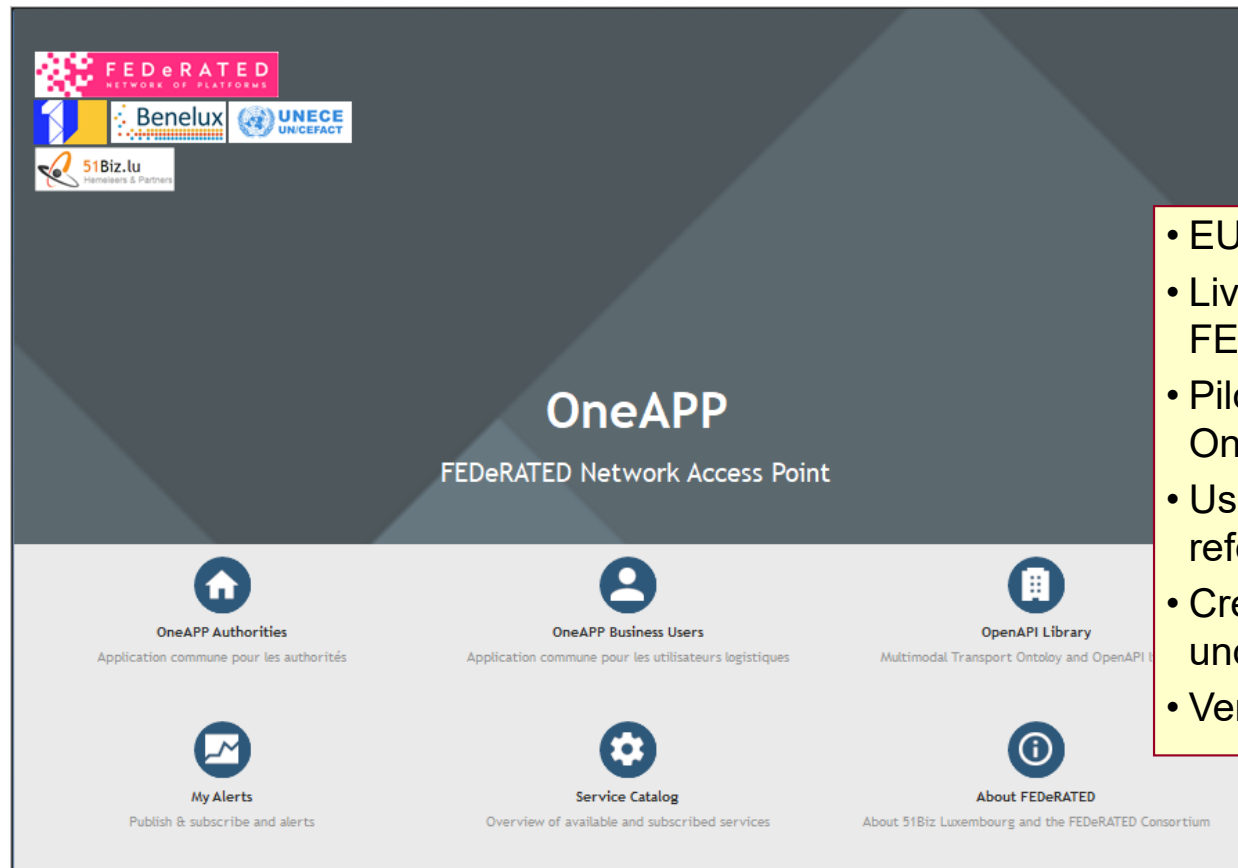
Each logistics object has a unique ID and a URI (Unique Resource Index)



Towards an Internet of Logistics



EU-Gate e-CMR/eFTI Access Point Living Lab



- EU-Gate Access point
- Living lab of EU-Funded FEDeRATED consortium
- Pilot project of IATA OneRecord
- Use real-world multi-modal reference supply chains
- Create a common understanding about eFTI
- Version “minus 27”



Conclusions



rhemeleers@51biz.lu
<http://www.federatedplatforms.eu>

1. Digital twins in cross border supply chains

- Mirror of physical logistics objects
- Share data with multiple data eco systems
- Enable intelligent and autonomous transport
- Share events by publish/subscribe

2. FEDeRATED data sharing infrastructure

- Internet of logistics
- Unique ID and IRI
- API share events by publish/subscribe
- Common language integrates multiple vocabularies and ontologies

